

WHAT IS CLAIMED IS:

1. A polarization system comprising:

a first polarity member, the first polarity member
5 being configured to be placed in any

of a plurality of orientations to provide a
corresponding number of polarities, the first
polarity member including a plurality of indicia
with each indicium corresponding to a different
10 polarity;

a second polarity member, the second polarity member
being configured to be placed in any of a
plurality of orientations to provide a
corresponding number of polarities, the polarities
15 of the second polarity member being respectively
complementary to the polarities of the first
polarity member, the second polarity member
including a plurality of indicia with each
indiciu corresponding to a different polarity;

a first housing, the first housing including a window,
20 the first housing being configured to removably
retain the first polarity member such that a
single indicium of the first polarity member is
visible through the window; and

a second housing, the second housing including a
25 window, the second housing being configured to
removably retain the second polarity member such
that a single indicium of the second polarity
member is visible through the window; and

30 wherein, the first polarity member can be mated with
the second polarity member when the second
polarity member is placed in a polarity

complementary to the polarity of the first
polarity member.

2. The polarization system according to claim 1
5 wherein the first polarity member is a male polarizing key,
and the second polarity member is a female polarizing key.

3. The polarization system according to claim 2
wherein the male polarizing key is hexagonal-shaped, and the
10 female polarizing key is hexagonal-shaped.

4. The polarization system according to claim 1
wherein the indicia of the first polarity member are
numbers, and the indicia of the second polarity member are
15 numbers.

5. The polarization system according to claim 4
wherein the numbers of the first polarity member correspond
to the numbers of the second polarity member such that the
20 polarities of the first polarity member and the respectively
complementary polarities of the second polarity member are
each designated by a single number.

6. The polarization system according to claim 1 further comprising:

5 a third polarity member including a plurality of indicia with each indicium corresponding to a different polarity; and

10 a fourth polarity member including a plurality of indicia with each indicium corresponding to a different polarity, the polarities of the fourth polarity member being respectively complementary to the polarities of the third polarity member;

15 wherein the first housing includes a second window, the first housing being configured to removably retain the third polarity member such that a single indicium of the third polarity member is visible through the second window; and

20 wherein the second housing includes a second window, the second housing being configured to removably retain the fourth polarity member such that a single indicium of the fourth polarity member is visible through the second window; and

25 wherein, the third polarity member can be mated with the fourth polarity member when the fourth polarity member is placed in a polarity complementary to the polarity of the third polarity member.

7. The polarization system according to claim 6 further comprising:

a fifth polarity member including a plurality of indicia with each indicium corresponding to a different polarity; and

a sixth polarity member including a plurality of indicia with each indicium corresponding to a different polarity, the polarities of the sixth polarity member being respectively complementary to the polarities of the fifth polarity member;

wherein the first housing includes a third window, the first housing being configured to removably retain the fifth polarity member such that a single indicium of the fifth polarity member is visible through the third window; and

wherein the second housing includes a third window, the second housing being configured to removably retain the sixth polarity member such that a single indicium of the sixth polarity member is visible through the third window; and

wherein, the fifth polarity member can be mated with the sixth polarity member when the sixth polarity member is placed in a polarity complementary to the polarity of the fifth polarity member.

8. A polarizing key comprising:

a base, the base including a resiliently flexible tapered collar;

an indicia portion, the indicia portion being in spaced relation to the tapered collar, the indicia portion including a plurality of faces, each face having an indicium; and

a polarizing portion, the polarizing portion disposed asymmetrically to the indicia portion such that rotating the polarizing key about a longitudinal axis of the polarizing key changes the orientation of the polarizing portion.

9. The polarizing key according to claim 8 wherein the polarizing portion is a shaft to provide a male configuration.

10. The polarizing key according to claim 8 wherein the polarizing portion is a cavity to provide a female configuration.

11. The polarizing key according to claim 8 wherein the polarizing portion is a shaft.

12. The polarizing key according to claim 8 wherein the polarizing portion includes a perimeter.

13. The polarizing key according to claim 12 wherein the perimeter is generally semi-circular.

14. The polarizing key according to claim 12 wherein the perimeter is generally pear-shaped.

15. An electrical connector system comprising:

a first connector, the first connector including a housing, a first variable polarity member mounted to the housing, and a cam follower member mounted to the housing, the first polarity member being configured to be placed in any of a plurality of polarities; and

a second connector, the second connector including a housing, a second variable polarity member mounted to the housing, and a cam member mounted to the housing, the second polarity member being configured to be placed in any of a plurality of polarities, the polarities of the second polarity member being respectively complementary to the polarities of the first polarity member, and the cam member being movable between an open position and a closed position; and

wherein the cam member is configured to be operably arranged with the cam follower member such that moving the cam member from the open position to the closed position interconnects the receptacle and the plug.

16. The electrical connector system according to claim 15 wherein the first connector comprises a receptacle.

17. The electrical connector system according to claim 16 wherein the receptacle further includes a grounding spring.

18. The electrical connector system according to claim 17 wherein the grounding spring includes a plurality of hertz bumps.

19. The electrical connector system according to claim 16 wherein the receptacle includes a flange.

20. The electrical connector system according to claim 5 19 wherein the flange includes a first end having a pair of mounting holes and a second end having a pair of mounting slots.

21. The electrical connector system according to claim 10 19 wherein the receptacle further includes a grounding spring, the grounding spring being mounted to the flange.

22. The electrical connector system according to claim 15 wherein the first connector comprises a size 2 housing, and the second connector comprises a size 2 housing.

23. The electrical connector system according to claim 15 wherein the first connector comprises a size 1 housing, and the second connector comprises a size 1 housing.

24. The electrical connector system according to claim 15 wherein the first connector comprises a size 4 housing, and the second connector comprises a size 2 housing.

25. The electrical connector system according to claim 24 further comprising:

a third connector, the third connector comprising a size 2 housing.

26. The electrical connector system according to claim 30 15 wherein the cam follower member comprises a bayonet pin.

27. The electrical connector system according to claim 15 wherein the cam member comprises a coupler.

28. The electrical connector system according to claim 26 wherein the cam member comprises a coupler.

29. The electrical connector system according to claim 5 15 further comprising:

a panel, the panel including a cutout configured to accommodate the housing of the first connector such that the first connector can be front mounted to the panel or rear mounted to the panel.

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30. The electrical connector system according to claim 15 further comprising:

a panel, the panel including a cutout configured to accommodate the housing of the first connector;
and

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a retaining clip, the retaining clip configured to fit within the cutout of the panel, and the retaining clip being engageable with the cutout and the first connector such that the first connector can be push mounted to the panel.

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31. The electrical connector system according to claim 15 further comprising:

a pair of rails, the rails being in substantially parallel spaced relation to each other, each rail including a plurality of mounting holes; and wherein the first connector is configured such that the first connector can be mounted to the rails.

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32. The electrical connector system according to claim
15 wherein the housing of the first connector includes a
groove, and the electrical connector system further
comprises a first backshell, the first backshell including a
5 rib, the rib of the first backshell being retained in the
groove.

33. The electrical connector system according to claim
10 32 wherein the backshell is a clamp bar type.

34. The electrical connector system according to claim
32 wherein the backshell is a strain-relief type.

35. The electrical connector system according to claim
15 32 wherein the backshell is a shield termination type.

36. The electrical connector system according to claim
20 32 wherein the backshell is a shrouded shield termination
type.

37. The electrical connector system according to claim
25 36 wherein the shrouded shield termination backshell
includes a shrouded portion having a generally rectangular
aperture.

38. The electrical connector system according to claim
30 36 wherein the shrouded shield termination backshell
includes a shrouded portion having a generally circular
aperture.

39. The electrical connector system according to claim 32 further comprising a second backshell, the second backshell including a rib, the rib of the second backshell being retained in the groove, and the second backshell being mounted to the first backshell.

40. A method for interconnecting a plug and a receptacle comprising:

10 providing a first polarity member, the first polarity member being configured to be placed in any of a plurality of polarities.

mounting the first polarity member to the plug in a first polarity;

15 providing a second polarity member, the second polarity member being configured to be placed in any of a plurality of polarities

mounting the second polarity member to the receptacle in a second polarity, the second polarity being complementary to the first polarity;

20 engaging a cam follower with a cam member, the cam follower mounted to the receptacle, and the cam member mounted to the plug; and

moving the cam member from an open position to a closed position.

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41. The method according to claim 40 wherein the cam follower member comprises a bayonet pin.

42. The method according to claim 40 wherein the cam member comprises a coupler.

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43. The method according to claim 41 wherein the cam member comprises a coupler.

44. The method according to claim 40 further comprising:

front mounting the receptacle to a panel.

5 45. The method according to claim 40 further comprising:

rear mounting the receptacle to a panel.

10 46. The method according to claim 40 further comprising:

push mounting the receptacle to a panel with a retaining clip.

15 47. The method according to claim 40 further comprising:

mounting the receptacle to a pair of rails.

20 48. A removable insert for retaining at least one electrical contact, the insert being configured to be inserted into an electrical component, the insert comprising:

a body, the body including a hole for accommodating the contact;

25 a grommet mounted to the body for sealingly engaging the contact, the grommet including a hole for accommodating the contact; and

a resiliently flexible locking tab projecting from the body.

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49. The insert according to claim 48 further comprising:

5 a peripheral seal disposed around the body for providing a seal between the insert and the electrical component.

50. The insert according to claim 48 further comprising:

10 a second resiliently flexible locking tab projecting from the body.

51. The insert according to claim 48 wherein the locking tab includes a notch for operably receiving a tool to deflect the locking tab.

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52. The insert according to claim 51 wherein the notch includes a chamfered end.

53. The insert according to claim 48 wherein the body includes a groove, and the peripheral seal is disposed in the groove.

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54. The insert according to claim 48 wherein the body includes a plurality of holes, the grommet includes a corresponding plurality of holes, the holes of the grommet and the holes of the body being aligned respectively with each other and being arranged in a plurality of columns.

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55. The insert according to claim 54 wherein the grommet includes a plurality of indicia to indicate respectively a corresponding plurality of the columns.

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56. The insert according to claim 55 wherein each indicium comprises a color.

57. The insert according to claim 55 wherein each alternate column includes the indicium.

58. The insert according to claim 56 wherein each alternate column includes the indicium.

59. The insert according to claim 54 wherein the grommet includes a plurality of indicia, the indicia respectively disposed to indicate a corresponding plurality of the holes.

60. The insert according to claim 54 wherein the holes of the grommet and the holes of the body are arranged in a plurality of columns, and the holes of each column of the body are electrically interconnected to each other.

61. The insert according to claim 60 wherein the grommet includes a plurality of indicia to indicate the holes of each column are electrically interconnected together.

62. The insert according to claim 61 wherein the indicia includes a plurality of lines connecting the holes of each column.

63. The insert according to claim 55 wherein the indicia comprise numbers.

64. The insert according to claim 48 further comprising:

5 an interfacial seal mounted to the body and disposed such that the interfacial seal sealingly contacts a second insert when the insert and the second insert are mated.

65. An electrical connector comprising:

10 a housing, the housing including a cavity, and a removable insert, the insert configured to be removably retained in the cavity, the insert including a chamber for retaining a contact, the insert including a peripheral seal, and the peripheral seal engaging the cavity of the housing
15 to provide a seal between the insert and the housing when the removable insert is retained in the cavity.

66. An electrical connector comprising:

20 a housing, the housing including a cavity, and a removable insert, the insert including a chamber for retaining a contact, the insert including a locking member, the locking member being configured to releasably engage the cavity, the
25 locking member and the cavity cooperating when the locking member releasably engages the cavity to define a gap, the gap being sized such that a tool can be inserted in the gap to engage the locking member, thereby releasing the insert from the
30 housing.

67. The electrical connector according to claim 66 wherein the locking member includes a notch for operably receiving the tool to deflect the locking member.

5 68. The electrical connector according to claim 67 wherein the notch includes a chamfered end.

69. A removable insert for insertion into an electrical component comprising:
10 a body, the body including a plurality of holes for accommodating a plurality of contacts of a particular size; and
 a grommet mounted to the body for sealingly engaging the contacts, the grommet including a plurality of
15 holes for accommodating the contacts, and the grommet including an indicium to identify the particular size of contact which the insert can accommodate.

20 70. The insert according to claim 69 wherein the indicium is a color.

71. The insert according to claim 70 wherein the indicium is red to indicate 8 or 20 gauge contacts.
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72. The insert according to claim 70 wherein the indicium is yellow to indicate 12 gauge contacts.

73. The insert according to claim 70 wherein the
30 indicium is blue to indicate 16 gauge contacts.

74. The insert according to claim 70 wherein the indicium is violet to indicate optical fiber contacts.

75. The insert according to claim 70 wherein the indicium is green to indicate 22 gauge contacts.

76. A method for interconnecting a plug having a window and a receptacle having a window, the method comprising:

10 providing a first polarity member, the first polarity member being configured to be placed in any of a plurality of orientations to provide a corresponding number of polarities, the first polarity member including a plurality of indicia with each indicium corresponding to a different polarity;

15 removably mounting the first polarity member to the plug in a first orientation such that a single indicium of the first polarity member is visible through the window;

20 providing a second polarity member, the second polarity member being configured to be placed in any of a plurality of orientations to provide a corresponding number of polarities, the polarities of the second polarity member being respectively complementary to the polarities of the first polarity member, the second polarity member including a plurality of indicia with each indicium corresponding to a different polarity;

25 and

30 removably mounting the second polarity member to the receptacle in a second orientation such that a single indicium of the second polarity member is visible through the window;, the second orientation being complementary to the first orientation.

77. An electrical connector system comprising:
a receptacle, the receptacle including a cam follower
member; and
a plug, the plug being configured to be interconnected
with the receptacle, the plug including a cam
member and a wall surface, the cam member being
movable between an open position and an engaged
position, the cam member being configured to be
operably arranged with the cam follower member
such that moving the cam member from the open
position to the engaged position interconnects the
receptacle and the plug, the wall surface
including a window, and the window disposed such
that when the cam member is in the engaged
position, the cam follower member is visible
through the window.

78. The electrical connector system according to claim
77 wherein the cam follower member comprises a bayonet pin.

79. The electrical connector system according to claim
77 wherein the cam member comprises a coupler.

80. The electrical connector system according to claim
79 wherein the cam follower member comprises a bayonet pin.

81. The electrical connector system according to claim
77 wherein the wall surface comprises a cover plate.

82. The electrical connector system according to claim 79 wherein the coupler comprises a pair of arms, each arm including a slot, each slot including a first end and a second end, and the plug further comprising a pair of retaining pins, the retaining pins mounted to the plug housing and respectively disposed in the slots, the retaining pins disposed such that when the retaining pins are at the first ends, the coupler is in the open position, and when the retaining pins are at the second ends, the coupler is in the engaged position.

83. The electrical connector system according to claim 82 wherein both the first ends and the second ends of the slots include a detent for locking the coupler in the open position and the engaged position, respectively.

84. An electrical connector system comprising:
a receptacle, the receptacle including a cam follower
member; and
a plug, the plug being configured to be interconnected
5 with the receptacle, the plug including a coupler
and a wall surface, the coupler being movable
between an open position and an engaged position,
the coupler being configured to be operably
10 arranged with the cam follower member such that
moving the coupler from the open position to the
engaged position interconnects the receptacle and
the plug, the coupler including an arms, the arm
including a first indicator strip, the first
15 indicator strip being disposed such that when the
coupler is in the open position, the first
indicator strip is visible, and when the coupler
is in the engaged position, the first indicator
strip is obscured from view by the wall surface.

20 85. The electrical connector system according to claim
84 wherein the arm of the coupler further includes a second
indicator strip, the second indicator strip being disposed
such that when the coupler is in the open position, the
25 second indicator strip is visible and when the coupler is in
the engaged position, the second indicator strip is obscured
from view by the wall surface.

86. The electrical connector system according to claim 84 wherein the arm of the coupler further includes a third indicator strip, the third indicator strip being disposed such that when the coupler is in the open position, the third indicator strip is obscured from view by the wall surface and when the coupler is in the engaged position, the third indicator strip is visible.

87. The electrical connector system according to claim 85 wherein the arm of the coupler further includes a third indicator strip, the third indicator strip being disposed such that when the coupler is in the open position, the third indicator strip is obscured from view by the wall surface and when the coupler is in the engaged position, the third indicator strip is visible.

88. A strain-relief backshell comprising:
a generally U-shaped base, the base including a pair of mounting ears, an outer surface, an inner surface, and a rib, the rib being disposed on the inner surface; and
a frame, the frame includes a plurality of fingers for providing strain relief, wherein at least two of the fingers are disposed at different orientations along the frame.

89. An electrical connector system comprising:
a receptacle, the receptacle including a housing, a
first removable insert, a first polarity member, a
first contact, and a cam follower member, the
housing configured to receive the first removable
insert, the first insert including a chamber for
retaining the first contact, and the first
polarity member being configured to be placed in
any of a plurality of orientations to provide a
corresponding number of polarities; and
a plug, the plug including a housing, a second
removable insert, a second polarity member, a
second contact, and a cam member, the housing
configured to receive the second removable insert,
the second insert including a chamber for
retaining the second contact, the second polarity
member being configured to be placed in any of a
plurality of orientations to provide a
corresponding number of polarities, the polarities
of the second polarity member being respectively
complementary to the polarities of the first
polarity member, and the cam member being movable
between an open position and a closed position;
wherein, the receptacle is configured to be
interconnected with the plug such that the first
contact is electrically interconnected with the
second contact and that the first polarity member
can be mated with the second polarity member when
the first polarity member is placed in a
complementary polarity; and
wherein the cam member is configured to be operably
arranged with the cam follower member such that
moving the cam member from the open position to

the closed position interconnects the receptacle and the plug.

5 90. A backshell system for mounting to an electrical connector, the backshell system comprising:
a first backshell, the first backshell being a type selected from the group consisting of a clamp backshell, a strain-relief backshell, and a shield termination backshell; and
10 a second backshell, the second backshell being a type selected from the group consisting of a clamp backshell, a strain-relief backshell, and a shield termination backshell; and
wherein the first backshell and the second backshell
15 are mountable to the electrical connector.

20 91. The backshell system according to claim 90 wherein the electrical connector includes a groove, the first backshell includes a rib, and the second backshell includes a rib, and the ribs of the backshells retentively engage the groove of the electrical connector when the backshells are mounted to the connector.

25 92. The backshell system according to claim 90 wherein the first backshell includes a mounting hole, the second backshell includes a mounting hole, and the mounting hole of the first backshell and the mounting hole of the second backshell are configured to be aligned for connecting the first backshell to the second backshell such that the
30 backshells are mounted to the electrical connector.

93. The backshell system according to claim 90 wherein the second backshell is a type different than the type of the first backshell.

5 94. A shield termination backshell comprising:
a base, the base including a mounting ear, an outer
surface, and an inner surface;
a contact cavity, the contact cavity being configured
to retain an electrical contact; and
10 a grounding spring, the grounding spring configured to
engage the electrical contact retained in the
contact cavity to provide an electrical connection
between the contact and ground.

15 95. The shield termination backshell according to
claim 94 wherein the base includes a rib, the rib being
disposed on the inner surface.

20 96. The shield termination backshell according to
claim 94 further comprising an insert.

97. The shield termination backshell according to
claim 94 wherein the base is generally U-shaped.

25 98. The shield termination backshell according to
claim 94 wherein the base includes a shroud portion.

30 99. The shield termination backshell according to
claim 98 further comprising an insert, wherein the shroud
portion is configured to present a flush appearance with the
insert.

100. The shield termination backshell according to claim 98 wherein the shroud portion defines an enclosure portion.

5 101. The shield termination backshell according to claim 100 wherein the shroud portion includes a generally rectangular aperture.

10 102. The shield termination backshell according to claim 100 wherein the shroud portion includes a generally semi-circular aperture.

15 103. The shield termination backshell according to claim 94 wherein the contact cavity includes a retaining portion for retaining the contact.

20 104. The shield termination backshell according to claim 103 wherein the retaining portion includes a projection having a ramped surface and a shoulder.

 105. The shield termination backshell according to claim 94 wherein the grounding spring comprises a first layer and a second layer.

25 106. The shield termination backshell according to claim 94 wherein the grounding spring comprises a tab having a hertzian bump.

107. A mounting system comprising:

an electrical connector, the electrical connector
including a generally rectangular housing having a
cavity for retaining an insert and a flange, the
insert configured to retain a contact; and
a panel, the panel including a cutout configured to
accommodate the housing of the first connector;
and

wherein the flange is configured such that the
electrical connector can be mounted to the panel
in a manner selected from the group consisting of
front mounted, rear mounted, and push mounted.

108. The mounting system according to claim 107 wherein
the flange of the housing is generally rectangular.

109. The mounting system according to claim 107 further
comprising a retaining clip for push mounting the electrical
connector.

110. A mounting system comprising:

an electrical connector, the electrical connector
including a generally rectangular housing having a
cavity for retaining an insert and a flange, the
insert configured to retain a contact; and
a pair of rails, the rails being disposed in
substantially parallel relation to each other a
first distance; and

wherein the first distance is such that the flange of
the electrical connector can be mounted to the
rails.

111. The mounting system according to claim 110 wherein the flange of the housing is generally rectangular.

112. A modular electrical connector system comprising:
5 a first housing, the first housing having a first number of cavities;

a second housing, the second housing having a second number of cavities, each cavity of the second housing being similar to each cavity of the first housing;
10

a removable insert, the removable insert being configured to be inserted into any one of the cavities of the first housing and the second housing.
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113. The modular electrical connector system according to claim 112 wherein the first number of cavities is selected from the group consisting of one, two, and four, and the second number of cavities is selected from the group consisting of one, two, and four.
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114. The modular electrical connector system according to claim 112 wherein the first number of cavities is different than the second number of cavities.
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115. The modular electrical connector system according to claim 113 wherein the first number of cavities is different than the second number of cavities.
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116. The modular electrical connector system according to claim 112 wherein the removable insert includes a peripheral seal to provide a seal between the removable insert and the cavity into which the removable insert is installed.

117. The modular electrical connector system according to claim 112 wherein the removable insert includes an interfacial seal.

118. The modular electrical connector system according to claim 112 wherein the removable insert includes a chamber configured to retain a contact and a locking tab to retentively engage the cavity into which the removable insert is inserted.

119. The modular electrical connector system according to claim 112 wherein the removable insert is selected from the group consisting of a 22 gauge pin insert, a 20 gauge pin insert, a 16 gauge pin insert, a 12 gauge pin insert, an 8 gauge pin insert, a fiber optic pin insert, a coaxial pin insert, a 22 gauge bussed pin insert, a 20 gauge bussed pin insert, a blank pin insert, a 22 gauge socket insert, a 20 gauge socket insert, a 16 gauge socket insert, a 12 gauge socket insert, an 8 gauge socket insert, a fiber optic socket insert, a coaxial socket insert, a 22 gauge bussed socket insert, a 20 gauge bussed socket insert, and a blank socket insert.

120. The modular electrical connector system according to claim 112 wherein the removable insert includes a chamber configured to retain a contact, and the contact is selected from the group consisting of a 22 gauge pin contact, a 20 gauge pin contact, a 16 gauge pin contact, a 12 gauge pin contact, an 8 gauge pin contact, a fiber optic male contact, a coaxial male contact, a 22 gauge socket contact, a 20 gauge socket contact, a 16 gauge socket contact, a 12 gauge socket contact, an 8 gauge socket contact, a fiber optic socket contact, and a coaxial female contact

121. The modular electrical connector system according to claim 112 wherein the removable insert comprises a plurality of chambers, each chamber configured to retain a contact.

122. A retaining clip for mounting an electrical connector to a panel having a cutout, the retaining clip comprising:
a frame; and
a pair of resiliently flexible sidewalls depending from the frame, each sidewall including a panel latching member and a connector support;
wherein the latching members are configured to engage the cutout to removably attach the retaining clip to the panel, and the frame and connector supports are configured to retain the connector.

123. The retaining clip according to claim 122 wherein the panel includes a mating surface, each latching member includes a tab, each tab configured to extend from the mating surface of the panel when the retaining clip is removably attached to the panel.